REMARKS

Claims 1-22 and 65-69 are presented for consideration. Claims 1-15, 19-22, and 65-68 are currently amended. Claims 23-64 were previously cancelled. No claim is presently cancelled.

Claims 1-22 and 65-66 stand rejected under 35 U.S.C. §102(b) as being anticipated by EP 0630044 to Okumura et al., herein after Okumura.

Claims 67-69 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Okumura in view of U.S. Pat. 6,669,683 to Santini, Jr. et al, hereinafter Santini.

In reference to claims 1-22 and 65-66, the Office Action states that Okumura shows,

> "...filling the substrate with openings to a predetermined solution to fill the openings with the material (solidified liquid pattern material, drying the liquid solution adhered onto the openings so as to form a layer in the openings, the SOG layer or SiO_2 layer is solidified (SOG layer formed by spin on coating, palladium layer (electrically conductive layer) formed in the openings)..."

Applicants contacted Examiner Chacko-Davis and Examiner's Supervisor Huff for clarification on various points of rejection. Applicants firstly question the intermixing of process steps for forming an insulator (SOG or SiO_2) with process steps for forming a conductor. Examiner Chacko-Davis explained that the rejections relying on SOG or SiO_2 were intended for claims not limiting themselves to a conductive material, and that the rejection relying on non-electric plating of palladium were intended for claims limiting themselves to a conductive material.

Following this reasoning, it would appear that the Okumura's process for non-electric plating of palladium are being applied to claims 1-4, 7, 10-15, 18, and 65-68, and Okumura's process for forming SOG or SiO_2 are being applied to claims 5, 6, 8, 9, 16, 17, and 19-22.

Although it is difficult to ascertain the separation in the Office Action's general recitation of process steps for both types of materials, it was agreed that a method for assuring that the presently claimed invention does not read on

Okumura's non-electric plating process is to specifically exclude plating in the claim language. Thus all independent claims are amended to specify that the claimed process steps are in an absence of electroplating and an absence of non-electric plating (plating term used in Okumura reference).

Also raised in the interview, was the issue of how a conductive solid material can be produced from a solution, or more generally from an electrically conductive liquid-pattern material (particularly through evaporation). The specification explains that the electrically conductive liquid pattern material can be made of an, "organometallic compound solution or a solution of a powder of an inorganic material dissolved in solvent" (as recited at least in paras. [0019], [0054], [0144], [0184]), and that a conductive material can be produced from such solutions through evaporation of a solvent. If additional details are desired, additional reference materials in the art may be provided upon request.

Although at least claim 2 already recited that the liquid pattern material is supplied while it is being dried (and thus could not be part of a plating process, such as Okumura's, which requires submersion in a solution during the entire plating process), a question was raised in the interview as to whether the word "while" necessarily meant that the liquid pattern matter is supplied at the same time that it is being dried. To remove any unintended ambiguity, at least claim 2 is amended to more clearly recite that the liquid pattern material is dried at the same time that it is being supplied. Support for this limitation is found at least in para. [0023].

Claim 7 is further amended to specify that the same electrically conductive liquid-pattern material is supplied each time step (b) is repeated.

To further distinguish the present invention, claims 7, 8 and 9 are amended to recite that the liquid-pattern material is a "solution" so as to more clearly define the meaning of the solute and solvent that comprise the solution. This better distinguishes the claimed invention from SOG, SiO_2, or any plating process.

In regards to the claims that do not recite a conductive liquid pattern material, Applicants respectfully point out that at least claim 5 already recited that the liquid-pattern material is supplied to the pattern-forming openings *without*

submerging said workpiece *surface* in said liquid-pattern material. This is clearly contrary to SOG, which requires that molten glass be spread to cover the entire surface of a workpiece. Nonetheless, to remove any unintended ambiguity, claim 5 is amended to specify that liquid-pattern material is selectively supplied to the pattern-forming openings. This is clearly contrary to spin-on-glass which requires that molten glass be spread across all surface areas of a workpiece, and not selectively to specific openings. Applicants further point out that SiO_2 is not a liquid that is later solidified, but rather is an oxidation process of a surface material.

Applicants further point out that at least claims 5 and 6 already recited a drying process step for "producing dried solute in the pattern-forming openings by evaporating solvent from the liquid-pattern material", which, as was brought up in the interview, does not read on spin-on-glass, or any other glass process, since glass is not solidified (and cannot produce any dried solute) by evaporating a solvent from the glass, particularly in the SOG process.

Applicants further point out that claim 5 already specified an annealing process for annealing the dried solute *after* evaporating away the solvent from the liquid pattern material through the drying process. It is clear that since glass does not produce any dried solute by evaporation of a solvent, neither can it teach or suggest an annealing of the resultant dried solute.

To further remove unintended ambiguity, whenever a claim step required that previous claim steps be repeated, the claims are amended to specify that the repeated steps are repeated in the stated order. This should eliminate any question of process step sequence.

Claims are also amended to specify that when a step of supplying a liquid-pattern material (or solution) is repeated, the same material (or solution) is supplied. That is, a first supplied material cannot be substituted for a second supplied material.

In reference to Santini, the Office Action explains that,

> "Santini, in col. 12, lines 58-67, in col. 13, lines 1-14, discloses the method of filing pattern openings with material using an inkjet printer"

Applicant respectfully point out that col. 12, lines 58-67, in col. 13, lines 1-14, and specifically col. 12, lines 62-66 state,

> "... A thin film of material is deposited on the substrate by methods such as evaporation, sputtering, chemical vapor deposition, solvent casting, slip casting, *contact* printing, spin coating, or other think film deposition techniques known in the art."

As is evident from the above excerpt, no where is an inkjet printer recited. The only recited printing technique is "contact printing", which requires the brushing of a first material onto a surface, and which is directly opposite to an inkjet printer, which projects ink droplets onto a surface.

The Office Action then states that, "it would be obvious to a skilled artisan to modify Okumura's method of filling the conducting material in the openings by employing the method of using an inkjet printer" because of benefits recited in Santini. Applicants respectfully point out that Okumura's method of filling conductive material in openings is through non-electric plating, which requires submersion in a solution, an introduction of an acid, maintaining the surface submerged for the duration of a self-terminating chemical process, then extracting and cleaning the plated surface. It is not clear how this plating process can be incorporated into an inkjet printer.

Applicants further point out that Santini describes the use of inkjets (cols. 10 and 11) in the structural construction of caps for capillaries (col. 10, lines 66 to col. 11, line 2 and col. 11, lines 14-18), but does not describe the use of inkjets in the construction of electronic circuitry, and definitively not in the construction of conductive electrical traces. Since Santini does not teach the use of inkjets in the construction of electrical traces, it is not clear how it can be obvious to substitute Santini's process for constructing capillary caps (which are relatively large structures) in place of process steps for constructing electrical traces in circuitry.

Nonetheless, Applicants point out that the claims are currently amended to exclude any plating processes, and should thus exclude any reading on Okumura's teachings.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration of the present application.

Respectfully submitted,

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